

*Mode of taking facsimiles of coins.*—By VINCENT TREGGAR, Esq.

The coin is placed between two dices of lead, and the whole compressed, either by a lever or screw, till the coin is well indented into the lead, from which latter impressions, the wax ones are made, and, being in relief, are of course far better than if taken from the coin itself.

To form the dice, a piece of plank, about one-third of an inch thick, is bored though with a centre bit somewhat smaller than the coin to be copied, it is then cut into halves, to facilitate the removal of the lead which is cast into it, the mould being placed in a piece of smooth wood, or still better, on a piece of dry brick rubbed very smooth. The bottom of the dice may not be smooth at first but will be so after a few castings have heated the brick, or it may be heated on the fire while the lead is melting. The best mould is a brass ring, the hole being bored or turned slightly conical then by merely raising it the lead falls out; it should be laid on a piece of brass nicely polished, which will give the lead a bright smooth face. A screw press is the best, but a simple lever will answer every purpose; care being taken to keep all level that the coin may sink equally into the lead, and the pressure must be removed when the edges of the lead meet or nearly so, according to the thickness of the coin. There is very little danger of injuring the coin, the lead being the softer metal, but if from any cause, the relief, for instance, on one side falling opposite a hollow or plain surface on the other, there should be a chance of deforming it, the best plan is to take each side separately, the opposite one being imbedded in sealing wax.

To obtain a perfect impression from the leaden dice they should be heated, which is most conveniently done by melting a small quantity of sealing wax\* and leaving the dice on it while the wax for the impression

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Thes. Palat') to be none but *Omphale*, 'accuratiore carminis *Ovidiani* consideratione inductus, 'as Bayer informs us. He himself is cautious as to giving a decisive opinion, saying in his description of the gem, 'IOLE, nisi potius *OMPHALE*, amasia *HERCULIS*, cujus ea clavam, et leoninum integumentum jocose oblatum gestat.' The identity of the design could not be more satisfactorily proved than by the 'jocose oblatum' of Bayer, compared with Lt. Cunningham's similar expression. This instance of the discovery in the East of the duplicates of gems of Grecian origin extant in the West is not the only one which I shall shortly have it in my power to cite, presenting more remarkable features than those of mere identity.

A gem (No. 4, Tab. VI.) of the Ebermayer collection is also nearly identical with No. 9, of the plate before us. It represents with better execution, a crow seated on, instead of *beside* (as in No. 9), a low shrub, in exactly the same attitude as in our gem. This may represent the crow, Bayer suggests, sacred to Apollo, 'nisi rectius censuit (l. c. 19) Gronovius, quod sit *cornix ab ilice pradicens* decantata Virgilio.' The attitude and expression of the bird fully favour the ingenious suggestion, but it is singular to find a passage in the *Bucolics* Ed. IX. illustrated on a gem from Afghanistan.

\* This wax can be used to heat several seals with.

is preparing, for the latter an argued lamp is the best as it does not discolour wax, a quantity must be dropped on a card sufficient to form the seal, and then the whole re-heated and the warm lead pressed down while the wax is very hot, but not so long as any air bubbles continue to rise, and it would be better to mix the wax with a thin bit of stick, drawing it somewhat towards the centre; the lead should not be removed until the wax is quite hard, and then, if the operation has been carefully performed the impression will be found as perfect as the coin itself. I have found the common hard yellow wax of the bazaar to take the most legible impression and would recommend the use of it in preference to any other colour.

I beg to suggest that the Society make a collection of such impressions, which would be valuable as a means of reference, particularly in the case of such coins as are taken from the country. They should not be shut up in a cabinet, but placed in frames, formed of a thick plank bored with holes of a fit size and covered with a glass front fitting close to the surface of the wood—the metal of the coin might be indicated, as in engravings, by its initial letter placed between the impressions; and the legend written above it, the whole classed and arranged in chronological order as far as possible. For the sake of uniformity the Society might decide on a particular coloured wax to be used in all impressions made for their collection, and the cards used should be left uncut, to be subsequently fitted to the holes in the frames which, of course, would be all of one size.

The Society would thus have the benefit of a large collection without any expense, and I have no doubt that every one who has a collection would gladly take the little trouble required to furnish copies of his coins. I must repeat there is no danger of harming most coins, as my friend Capt. Cunningham and myself have subjected our own to the ordeal without injury.

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*Report on the Soda Soils of the Barramahal.* BY CAPTAIN CAMPBELL, ASSISTANT SURVEYOR GENERAL.

Soda soils are very common in the principal plain of the Baramahal in the Salem District, which is bounded on the North by the Hills of Congoondy, on the East by the Jawaudy Hills, on the South by the abrupt break in the levels at the Topoor Ghaut, and on the west by the hills of Roycottah.

In extent they are generally not more than about  $\frac{1}{2}$  a mile square; the

soil is sandy and incapable of supporting vegetation, no herb growing on them, but a scanty scrubby grass. In general they lay upon a bed of Kunkur, which is sometimes, as near Paulcode, of considerable depth.

These beds of soda soil are well known to the natives, who call them in Tamul, Chour Munno—and extract the soda for the purpose of fluxing powdered white quartz to make bangles with. The Dhobees also collect the earth, and by lixivating it make a solution of soda which they use in washing clothes by adding quick lime, to make the solution caustic. But so ignorant are they in general of the principle of the mode of use, that they often convey the earth sometimes fifty miles, not being aware that the labour of carriage might be decreased by extracting the salt.

The Bangle makers extract the impure soda by mixing the earth with water in a pit, and allowing it to settle, the solution is then drawn off, and evaporated by sprinkling it on cowdung spread upon the surface of a granite rock. When the cake has become about half an inch in thickness, it is taken off and is broken into pieces, in which state it is called Chour Billah and is stored in houses for use, sometimes to the amount of 400 maunds.

The Chour Billah is sold at the rate of  $17\frac{1}{2}$  Rupees per ton, and contains 23 per cent. of insoluble matter, the soluble part being in greatest part all carbonate of soda with a little vegetable and extractive matter, and some muriate and sulphate of soda in small quantity. A solution of it will not crystallize in consequence of the extractive matter, and the natives are quite ignorant of the mode of crystallizing it, and do not even know that it contains a salt.

In Bengal soda soils are also found, but according to Dr. O'Shaughnessy, (*Manual of Chemistry*, page 227) it contains 15 per cent. of sulphate of soda, which salt being more soluble in hot than cold water cannot be separated by crystallization from the carbonate, and the product of these soils in Bengal cannot therefore be applied to any useful purpose unless the very expensive process of decomposing the sulphate by fusion in a furnace is resorted to.

Being engaged in an extensive chemical examination of the minerals of this district in which pure carbonate of soda is required in considerable quantity as a flux, and as the price of the salt as vended in retail at Madras is very great, it has occurred to me to endeavour to supply the want from the mineral resources of the country.

I have found by experiment that a very pure carbonate of soda may be separated from the crude soda, which the soils of Barramahal yield by simply charring the Chour Billah, or the residue, after evaporating to dry-



ness in a gentle heat, by which the extractive and vegetable matters are converted into charcoal, and can then be simply extracted by filtering, and the solution will then crystallize on evaporating to a *pellicle*. The first crystallization gives a tolerably pure soda, coloured a little by the impurities, but after crystallizing 3 or 4 times the crystals are beautifully white and transparent, and after six crystallizations, the salt is so pure as hardly to give any precipitate with nitrate of silver or nitrate of barytes after supersaturation with nitric acid, denoting thereby the nearly total absence of any muriate or sulphate.

In England great quantities of carbonate of soda are required in glass making, soap making and dyeing. This was formerly prepared from the Spanish Barilla, which contains, according to Dr. Ure, muriate and sulphate of soda, lime and abumina, and only at most 24 per cent. of soda. A large quantity was also made from kelp prepared in the Scottish Isles, but this is no longer manufactured, as it has been found that in consequence of the cheap price of sulphuric acid, soda can be manufactured by decomposing the muriate of soda (common salt) at a price which remunerates the manufacturer.

In this operation the muriate is first decomposed by heating it in leaden vessels with sulphuric acid, by which the muriatic gas is driven off and which is condensed and allowed to run to waste as of no value, the demand in the arts for muriatic acid being very small. The resulting sulphate of soda is then mixed with charcoal and some lime, and is roasted by a powerful heat in a reverberatory furnace by which it is partly decomposed and formed into sulphurate of soda, which by further heat and stirring is again decomposed and the sulphur volatilized and an impure mixture of carbonate of soda ashes, and charcoal results, which is called in trade 'black balls,' and is an article of commerce.

This impure product is then further purified by solution in water, filtering, and evaporation to dryness without crystallizing, in which state it is called 'Soda Ash' and is used by the glass blowers.

The salt is still very impure, being mixed with sulphate and muriate of Soda, and does not contain its full equivalent of carbonic acid, being in fact a mixture of caustic and carbonate of soda.

For the makers of plate glass who require a very pure carbonate of soda as a flux, to prevent the chance of the glass being discoloured, the soda ash is mixed with sawdust, and is again fused in a powerful furnace, by which it is fully carbonized and rendered capable of crystallizing. It is then dissolved in water, and is crystallized once for the use of the plate glass makers, and six or seven times for the use of apothecaries. In the

latter state it is sold for 10 pence per pound retail or 52 per cent wholesale. In this state I have found by experiment that the article is exactly the same as the product before described, and the two are therefore equally valuable.

For the plate glass makers the necessity of having the flux pure is so great, that the expensive process of decomposing common salt by pearlsh (carbonate of potash) is sometimes resorted to and the resulting muriate of potash being a little crystallizable, the carbonate of soda is separated by evaporation and crystallization.

The cost of manufacture from the Indian mineral soda cannot be ascertained but by extensive experiment, but as it will be seen that the process I have described, is very much the same as that in making saltpetre, the inference, that the expense will be nearly the same in both manufactures, may be allowed, and as saltpetre is made for 2 Rupees per maund, therefore it would seem that nearly pure carbonate of soda can be manufactured in South India for less than 5 Rupees per cent.

As the soils which yield this product, are now quite unproductive, and the time required for the manufacture is during the dry weather when the ryots are unemployed, the agricultural produce cannot be affected while the revenue will be certainly increased.

While the cotton trade of South India is so rapidly increasing, an article for export which will serve the purpose of dead weight for ballasting the ships will be much required, and as carbonate of soda is not affected by exposure to air or damp, it may be packed in bags and will be useful for the purpose.

As these soils are of limited extent, and as the manufacture cannot be carried on during the whole year, therefore the produce must always be limited, and the introduction of the article into the markets of England, cannot affect the present market price, because the quantity yielded in India can only take the place of a certain quantity now produced by the manufacturers of England, and the price will always therefore be regulated by that at which the English manufacturers can afford to sell.

On the introduction of the Indian Soda to the market of England the manufacturers will doubtlessly endeavour to prevent its sale by endeavouring to undersell it, even going so far as to sell their own manufacture at a loss, but as it has been shewn that the Indian Soda can be made for little more than 10 shillings per cent., it would seem impossible that the endeavour to exclude it from the English markets could be successful.

I have been unable to procure certain information regarding the price at which the inferior kinds of impure Soda are sold in England, but when the expensive and laborious process as above described, is considered, it seems almost impossible that any product can be made at so cheap a rate, as that procured by the simple manipulation required for the mineral salt.

I have endeavoured by sending to England samples through a commercial gentleman to make this report more complete, by being able to state the value of the article on certain grounds, but have been unsuccessful, the point appearing to depend in great measure on the import duty which will be charged in England. By the present regulations, natural alkali imported from places within the limits of the Honorable Company's charter pays a duty of 2 shillings per cent. but to ascertain the point it appears to be necessary to ship a few tons, and then try by experiment at what rate of duty the article will be admitted.

I am aware that some years ago attempts had been made to introduce Indian Soda into the English market, but which failed in consequence of the opposition of the English manufacturers, but I submit, that the soils now pointed out, yielding by single crystallization a pure Soda, were not before known, and in consequence, in the former experiments to which I refer, it became necessary to fuse the salt for the purpose of purifying it, which expensive process of course prevented a successful competition with the manufacturers of England.

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*Report on the Kaolin Earth of Mysore.—BY CAPT. J. CAMPBELL,*  
*Assistant Surveyor General.*

A great portion of the level surface of the table land of Mysore, is formed of a red ferruginous arenaceous earth, resembling much some of the softer varieties of the upper red sandstones of England.

This formation, which may be called for convenience 'Red Marle,' is superposed upon a continuous bed of hornblendic granite, and is connected with it by a graduation, both in structure and composition, through an interposed layer of white kaolin earth which is found between the two.

The kaolin is in some places several feet in thickness, and is generally of a pure white colour, and soft greasy feel, and is sometimes mixed with a fine quartze sand in small quantity.

This kaolin is mentioned by Dr. Heyne, who mistook it for pipeclay.